PUBLISHED BY 7X24 EXCHANGE INTERNATIONAL

7X24 Exchange® INTERNATIONAL

THE END-TO-END RELIABILITY FORUM™

DOWNTIME SEVERITY LEVELS (DSL)

A WAY TO MEASURE IMPACT OF DOWNTIME IN DATA CENTERS

CONFERENCE KEYNOTE

Florent Groberg
Head of Microsoft Azure's Global Government Mission; Former Captain, U.S. Army; Congressional Medal of Honor Recipient

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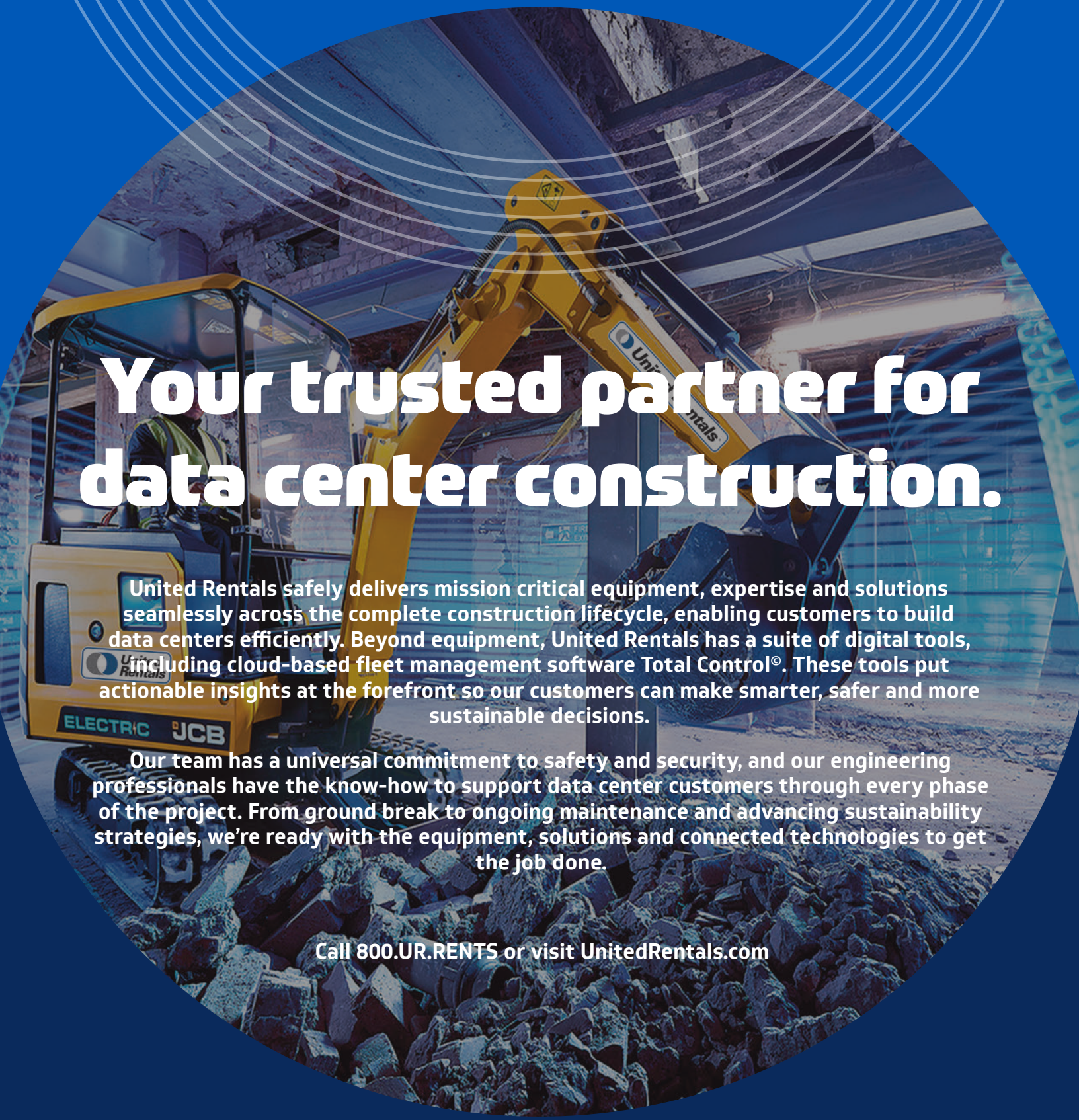

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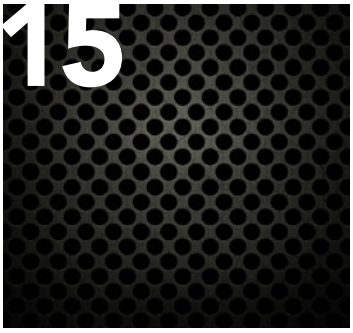

As a service to assist our valued members in staying informed about our dynamic industry, 7x24 Exchange is pleased to publish 7x24 Exchange® Magazine, offering articles by leading professional experts on current and future trends, best practices, and the state of our industry. Please note that the opinions and views expressed in these articles are those of the individual authors themselves, and do not necessarily reflect the views of 7x24 Exchange or any of our members.


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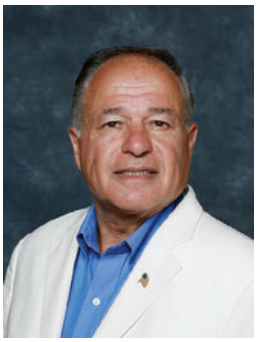
CHAIRMAN'S LETTER



Robert J. Cassiliano

The Coronavirus Pandemic wreaked havoc on the world killing millions of people and impacting the lives of millions of families. Businesses too were affected with loss of staff and new rules for working conditions including but not limited to mask mandates, space restrictions, and vaccine requirements. This caused businesses to change their normal way of operating, instituting new working situations such as working from home, setting up a hybrid working environment, and a multitude of video meetings making the words Zoom and Teams commonplace.

The Mission Critical events industry also felt the impact of COVID with conferences canceled in 2020 causing data center professionals to rely on webinars and virtual events for education and information. In 2021, 7x24 Exchange returned to conducting Spring and Fall conferences while others continued with virtual events. However the Data Center 101 student session was not conducted in 2020, 2021, or 2022 for concern of bringing students into a concentrated environment. But this is 2023 and we are pleased to announce that Data Center 101 is back.

We welcome the students to this very special session where 5 industry experts teach different data center disciplines: Technology & Facilities Data Center Overview – Rich Garrison, Alfa Tech – Architecture – Martin Gollwitzer, Perkins & Will – Electrical & Mechanical Infrastructure – James Coe, Syska Hennessy – Data Center Operations – Michael Swetz – State Street Bank – Education & Employment Opportunities – Dennis Cronin, Resilient Solutions. We are extremely grateful to these industry professionals and their companies for supporting the Data Center 101 Student Session.

The goal of 7x24 Exchange conferences is to provide attendees with quality education, networking, and information sharing all in an environment designed for a memorable experience for attendees and guests. 7x24 Exchange is committed to providing value to members, conference participants, and their companies.

The theme for the 2023 7x24 Exchange Spring Conference being held at the JW Marriott Orlando Grande Lakes in Orlando, Florida from June 4-7, 2023, is End to End Reliability: "Pandemic Lessons Learned". Conference highlights are as follows:

- Sunday evening Welcome Reception
- Data Center 101 Student Session
- Conference Keynote: "Opportunities Earned & Leadership Learned: An American Hero's Journey" by Florent Groberg, Head of Microsoft Azure's Global Mission; Former Captain, U.S. Army; **Congressional Medal of Honor Recipient**
- Keynotes by Compass Datacenters, and Vertiv
- Talk from ABB, Corscale, ZincFive, and kW Mission Critical Engineering
- Panel on Pandemic Lessons Learned During the Commissioning Phases – participants include: Cologix, EYP Mission Critical Facilities, Part of Ramboll, and NTT
- 7x24 Exchange WiMCO Panel: The 21st Century Gold Rush: Will the Education Gap Result in Fools Data? – participants include Digital Realty, Envirotrol, Primary Integration Bureau Veritas, and Meta
- Panel on We are at an Inflection Point – Direct Liquid Cooling – participants include: Cascade Mission Critical, Integra Mission Critical, Microsoft, and Shumate Engineering
- Talks from BMO Financial Group and Siemens, Compass Datacenters and Schneider Electric
- Presentations from The Siemon Company, University of Pennsylvania, and Uptime Institute
- WiMCO Networking Reception on Monday sponsored by Meta
- Exchange Tables on specific topics at Tuesday lunch
- Tuesday Sponsored Event "An Evening at Universal Orlando Resort"

The program content is designed to provide value to conference participants and their companies by focusing on important topics of the day. COVID lessons learned, Artificial Intelligence (AI) in Data Centers, Sustainability, and re-introduction of the Data Center 101 Student Session are highlighted at this year's Spring event.

I look forward to seeing you at the Spring Conference in Orlando, Florida!

Bob

Bob Cassiliano presents Conference Keynote, Admiral Mike Rogers, with a donation to "International Bipolar Foundation" on his behalf.

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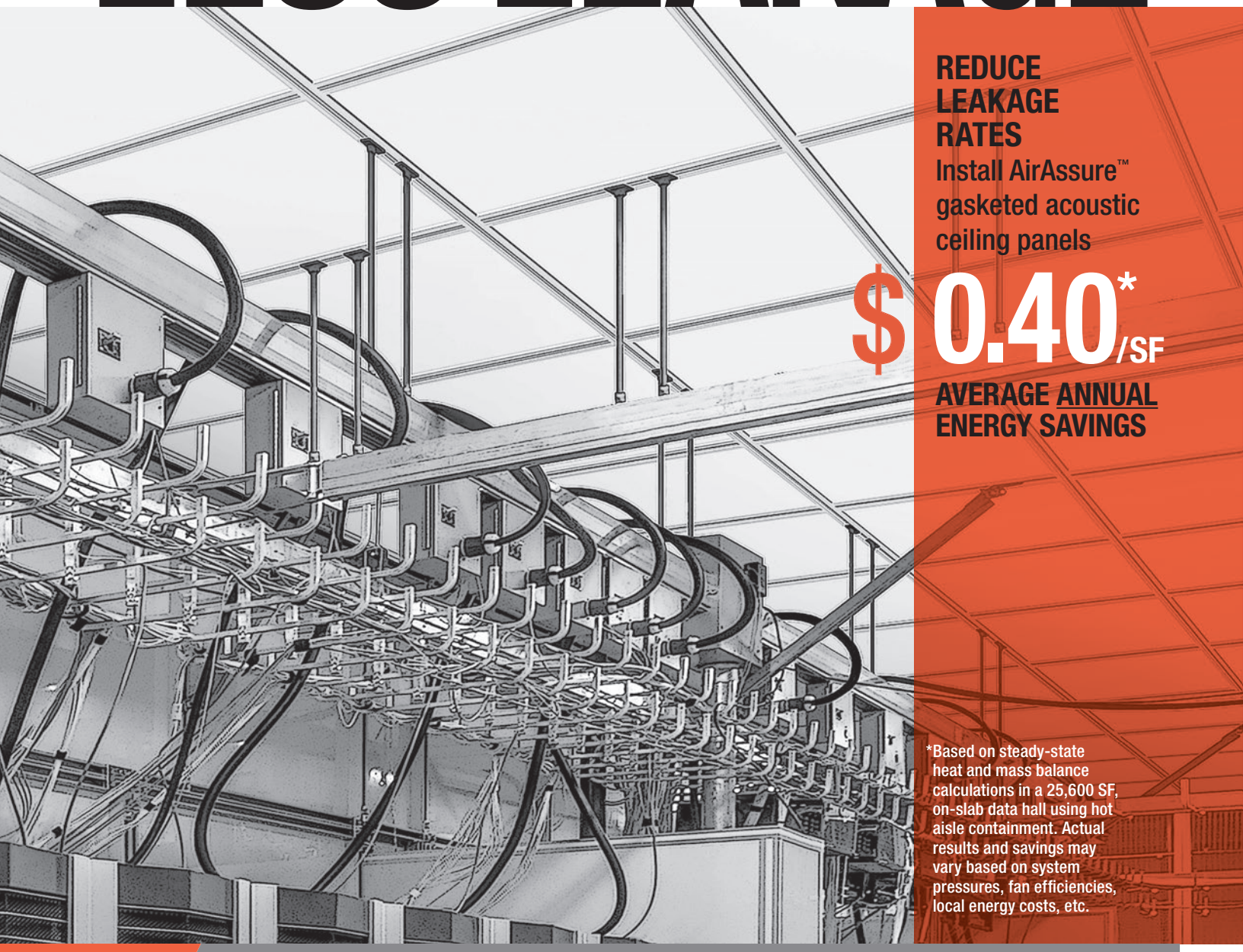

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DOWNTIME SEVERITY LEVELS (DSL)

A WAY TO MEASURE IMPACT OF DOWNTIME IN DATA CENTERS

by Jorge A. Gil

DATA CENTER DEPTH OF IMPACT AND CAUSES OF DOWNTIME

The DSL system is a very straight forward approach that can be used effectively to categorize the state of the Data Center facility, in the event of maintenances, failures, and non-inherent incidents. This methodological approach has been conceived considering two dimensional aspects of Downtime:

- Depth of Impact (Structure/Systems Affected)
- Causes of Downtime (Typification)

1. DEPTH OF IMPACT

DSL is tied accordingly to the "Depth of Impact", that might also be translated as the "Depth of Failure" (The Depth of Data Center failure). Data Centers inherent downtimes can be caused and aggregated from a broad perspective, by two different situations: Failure events and Maintenance events. Events that are non-inherent to the Data Center's mission, could be "External Events" or "Non-inherent Internal Events", and from the vantage point of the Data Center mission critical objective, every downtime event could be considered a "Failure Event", since they prevent the "7x24" business objective.

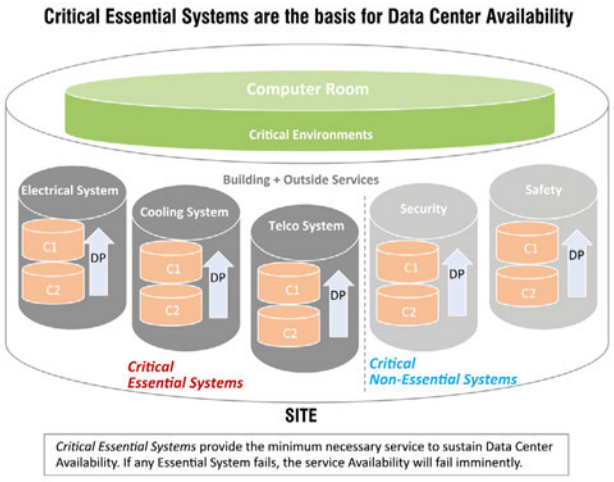

Figure 1. Critical Essential Systems are the basis for Data Center Availability

The Depth of Impact of Data Center downtime, is the level of affection caused by the failure, maintenance, or by any other internal/external event. It is the result of Data Center Systems/Structures hierarchization.

Critical Systems are conceptually composed by Capacity Components and Distribution Paths. That applies to

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any Critical System that provides service to the Critical Rooms. Data Centers have also purpose-built structures/rooms, that may contain components/distribution paths from different systems. Structures/rooms are considered part of the building and Site.

DEPTH OF IMPACT LEVELS:

a. Component Level

b. System Level

c. Critical Room Level

d. Site Level

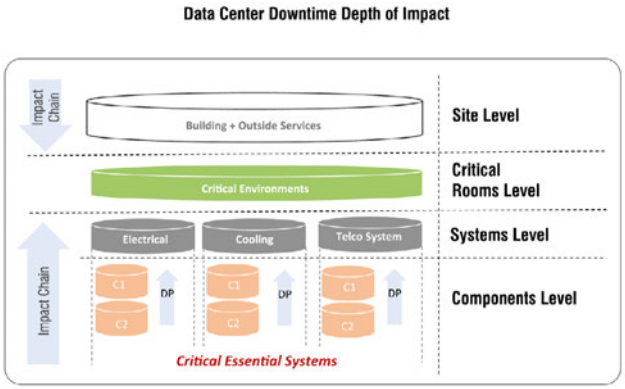

Figure 2. Data Center Downtime Depth of Impact

Component Level. Referred to a downtime impact affecting only Critical Components, i.e. UPS, CRAC, Chiller, Switchboard, etc. It usually refers to impacting, at least one critical component, without shutting down the whole related system. In that case, other Components or Mechanisms must exist in order to support the load of the off-line Component(s).

System Level. It is a Downtime event impacting a particular Critical System, i.e. Electrical System, Mechanical System, etc. In that kind of scenario, other parallel Systems must exist in order to support the load.

Critical Room Level. A Critical Room downtime means that the IT Load can no longer be supported, shutting down the IT Load delivery service. It could be a partial or full Critical Room downtime. A partial Critical Room downtime, affects only a specific area (Groups of IT Racks) of the Total Critical Room area.

Site Level. A downtime at Site Level means that an important area, or the full Site could be potentially compromised or damaged, also causing potentially Health/Life Threatening situations or insecure conditions. It might impact the IT Load (Critical Rooms), but not necessarily.

2. CAUSES OF DOWNTIME (CATEGORIES)

The other dimension considered by DSL, has to do with the causes of downtime. The DSL system categorizes Data Center downtimes in five categories.

CATEGORIES OF CAUSES OF DOWNTIME:

a. Planned / Preventive Maintenance

b. Failure / Corrective Maintenance

c. Critical Event

d. Catastrophic Event

e. Catastrophic Failure

Planned/Preventive Maintenance. Downtime caused by the need of Planned Preventive Maintenance (PM, PdM, RCM). Depth of Impact at:

- Component Level
- System Level

Failure / Corrective Maintenance. Downtime caused by Inherent Failures; therefore, a Corrective Maintenance must follow. The nature of the failure can be: inherent failure, human error, cascade failures, etc. Depth of Impact at:

- Component Level
- System Level

Critical Event. Downtime usually caused by cascade Component/System failures resulting in an Outage. Human Errors at Critical Room level, Accidental EPO activation, and any other Inherent related events capable of causing Outages (IT service delivery shutdown) are considered Critical Event downtimes. Depth of Impact at:

- Critical Room Level

Catastrophic Event. Incident caused by Inherent Failures or Internal/External Non-inherent Events, that triggers a Catastrophic condition without impacting the Critical Room. Examples: diesel spilled, fire under control, external hazmat spilled, disaster type event, etc. Any potentially Catastrophic Event, regardless of the structure/system where it occurred, must be considered a Site Level impact Catastrophic Event. Catastrophic Events can be Potentially Life-Threatening situations. Depth of Impact at:

- Site Level

Catastrophic Failure. Typically, the escalation of a Catastrophic Event, impacting the Critical Room/IT Load service availability. Depth of Impact at:

- Site Level & Critical Rooms

THE DOWNTIME SEVERITY LEVELS (DSL)

The DSL is a metric for internal use purposes for Data Center operations. It was designed as a communication tool, in order to address the severity of any incident/event that causes downtime to any component, system, structure of a Data Center, accordingly with the appropriate level of required response.

DSL can also be used as a way to analyze Downtime events in order to understand the chain of impact and, the escalation and de-escalation process. It accounts and categorizes inherent and non-inherent events that

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could impact Data Centers / Telco facilities availability.

DSL consists of seven levels of severity for Data Center downtimes (Figure 3).

7 Downtime Severity Levels (DSL)

Severity Level	Impact Depth	Situation	Site Condition
Severity 7	Site / Critical Rooms	Catastrophic Failure	Catastrophic Site Condition
Severity 6	Site Level	Catastrophic Event	Near Catastrophic Site Condition
Severity 5	Critical Rooms	Critical Event/Downtime	Critical Downtime/Outage Condition
Severity 4	System Level	System Failure	Abnormal Site Condition
Severity 3	System Level	System Preventive Mx	Vulnerable Site Condition
Severity 2	Components Level	Component Failure	Abnormal Site Condition
Severity 1	Components Level	Component Preventive Mx	Vulnerable Site Condition

Figure 3. 7 Downtime Severity Levels (DSL)

The 7 DSL is a simple way communicate about the level of severity of Downtimes. The corresponding Severity to any downtime will convey the Depth of Impact to Data Center operations.

Component level downtimes, for example, have two different levels of Severity according with the caused situation. A Preventive Maintenance work in a critical component, produces a controlled shutdown situation. That kind of downtime, creates a Vulnerable Condition to Data Centers, since redundant equipment should be used to keep the Data Center in operating condition. In that case, it would be a Severity 1 downtime (DSL Severity 1). However, if the Data Center depends of that sole piece of critical equipment (non-redundant component), the resulted severity would be a Severity 5 downtime (DSL Severity 5). Considering that the component shutdown consequences, would produce a Critical Downtime or Outage to the Critical Room. The Severity level (DSL) is attributed not only to the cause of the Downtime, but also to the level of impact to Data Center operations.

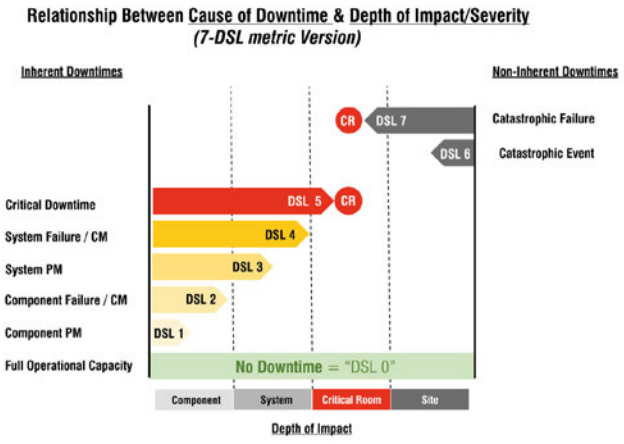

Figure 4. Relationship between Cause of Downtime & Depth of Impact/Severity

DSL Severity addresses where the *failure/event* is "contained", as it can be appreciated in the figure

4. Nonetheless, if inherent failures/events were not properly addressed, they may end up causing an Outage or Critical Downtime to the Critical Rooms. On the other hand, non-Inherent events produce impact to a Site level or potentially to Site level. If the Site level event is not contained, it may end up causing also an Outage/ Critical Downtime to the Critical Rooms. In that case it would be a Severity 7 downtime event, designated as a Catastrophic failure, since it produces an Emergency Site Shutdown (either manually or automatically).

DSL also states about the Overall Site Condition, by defining five Site Condition levels, associated with the Causes of Downtime categories, beginning with Normal Operating Condition (Full Operational Capacity), downtime Site Conditions are defined as:

- **Vulnerable Operating Condition,** for Planned/ Preventive Maintenance events.
- **Abnormal Operating Condition,** for Failures/ Corrective Maintenance events.
- **Critical Downtime,** for Critical Rooms downtime events.
- **Potential Site Shutdown / Near Catastrophic Site Condition,** for Catastrophic events.
- **Emergency Site Shutdown / Catastrophic Site Condition,** for Catastrophic events impacting the Critical Load.

It helps to convey and reinforce to the staff, about the consequential relationship and impact to Overall Site Operations, with the intention to keep everyone aligned with the Data Center mission objective.

In figure 5 *(Case Scenario #1)*, there is an example of how DSL can help to analyze incidents in a simple and effective way, in order to support graphically Abnormal Incidents and any other Downtime events. In the *Case Scenario #1*, can be seen the relationship between the cause of catastrophic event (highest Severity), as the result of a Preventive Maintenance human error, and the escalation and de-escalation process with the time duration of each severity level change and its associated impact.

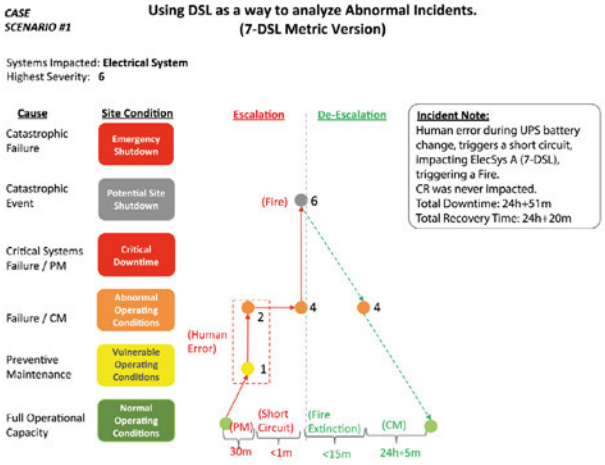

Figure 5. Using DSL as a way to analyze Abnormal Incidents (Case Scenario #1)

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Finally, figure 6 shows the relationship of several simulated downtime events and different Data Center topologies according to their criticality levels, and the resulting Severity level (DSL). It demonstrates that the severity level of any downtime event, has a direct relationship with the resiliency level of any Data Center. Basic Data Centers, which have non redundant components, have very limited to no alternatives, in order to avoid a Critical Downtime (Severity 5 downtime) when performing Preventive Maintenance at Component level. By contrast, Fault tolerant Data Centers, should be able to contain most inherent downtime events, and even some catastrophic events; depending of the site design configuration. This approach (DSL) can also help, in order to select the level of resiliency and design configuration to any future Data Center/Telco facility, by simulating different scenarios with inherent and non-inherent events.

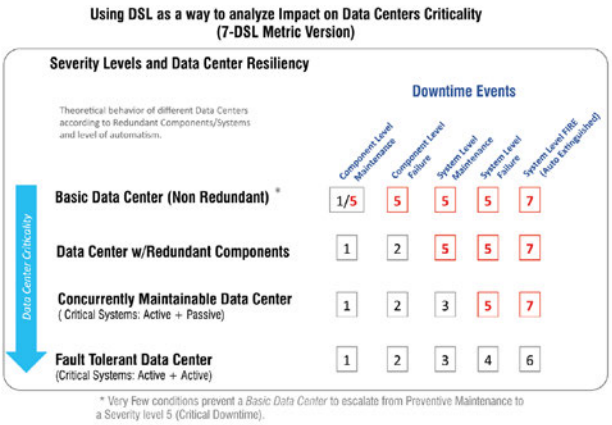

Figure 6. Using DSL as a way to analyze Impact on Data Centers Criticality

As shown in the figure 6, DSL can effectively be used to communicate about the severity of impact of any component/system/structure downtime, in order to understand where the *failure* occurred, what damage caused to Data Center operations, and how it should be treated accordingly, in order to restore the Site from the failure event to Normal Operating Conditions.

Jorge A. Gil, DCEP is Principal of SERES, LLC.
He can be reached at jagil@serestech.com.

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SCAN TO LEARN MORE

REDUCING BLACK CARBON AND GREENHOUSE GAS EMISSIONS FROM ON-SITE DIESEL GENERATORS

by Bryan Dusza

Reducing particulate matter emissions from standby generators has become an increasingly important goal for mission-critical facilities. The responsibility to ensure operations do not harm the environment or public health as well as comply with current and emerging environmental regulations and demonstrate a commitment to sustainable practices is vital. Ultimately, investing in clean energy sources and emission-reducing technologies can benefit both the environment and the long-term sustainability of mission-critical facilities.

Impacts of Diesel Emissions on Climate Change and Public Health

Diesel particulate matter, or PM, is made up of black carbon, or soot, in addition to many organic compounds. Diesel exhaust also contains gaseous pollutants including volatile organic compounds (VOCs) and nitric oxides (NOx). NOx emissions from diesel engines are important because they can undergo chemical reactions in the atmosphere leading to

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formation of particulate matter and ozone. Diesel exhaust also contains carbon dioxide (CO_2).

Calculating the precise volume of particulate matter generated by diesel engines annually can be challenging, as it varies depending on engine type, fuel type, and operating circumstances. According to some estimates, diesel engines generate a staggering **1.3 billion tons of particulate matter** globally each year.

Black carbon is a known carcinogen and causes strokes, heart attacks and chronic respiratory disease. The California Air Resources Board (CARB) estimates that diesel PM contributes to approximately **1,400 premature deaths** from cardiovascular disease a year in California alone. And a **2022 study** even links low-level exposure to particulate matter to behavior issues and lower IQ scores in 2- to 4-year-olds.

Having clean air to breathe is a key social determinate of health and should be treated just as importantly as access to education, healthy foods, employment and shelter.

Emissions Standards Impacting Mission-Critical Facilities

In recent years, emissions regulations have increased across North America, with California leading the charge. Mission-critical facilities often house a vast number of generator units in a relatively condensed area.

"When you have facilities with 30 to 50 units, multiplied across several facilities in a geographic area, the concern for regulation ramps up, especially when there are existing neighborhoods or communities in that area," said Roberto Montero of Rypos, a manufacturer of diesel exhaust aftertreatment filters.

As sustainability measures and ESG goals become increasingly critical, and concern over community health intensifies, reducing diesel engine emissions is a visible and measurable solution.

Diesel Particulate Filters and Their Role in Mission-Critical Facilities

Diesel Particulate Filters (DPFs) are exhaust after-treatment devices that can be fitted to a wide variety of engines, including the back-up generators essential to powering mission-critical facilities should a power failure occur. DPFs work to reduce exhaust emissions by trapping exhaust particulates in the filter, thus removing many harmful emissions from ever entering the air.

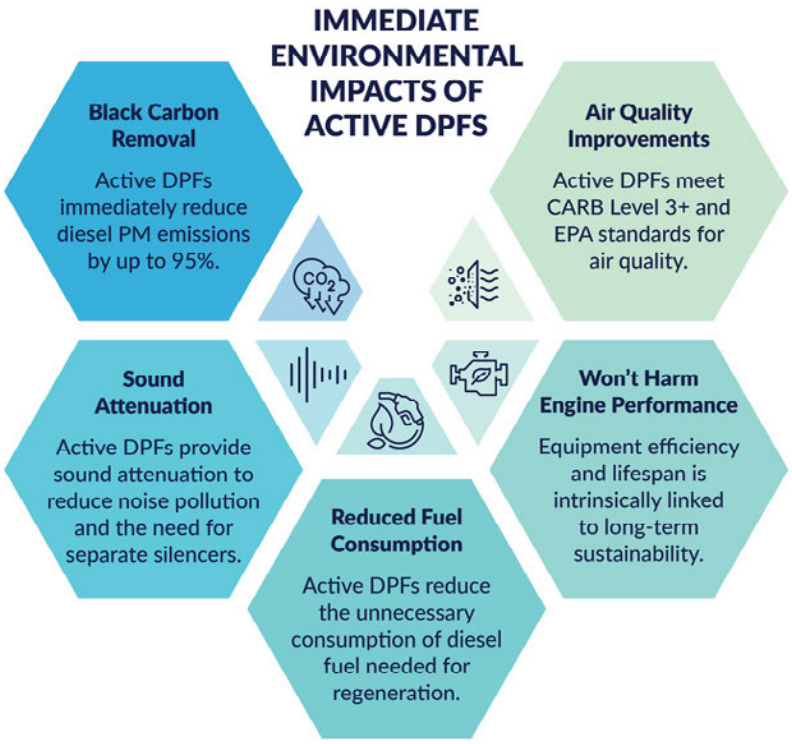
With continued use, DPFs need to be cleaned to remove the buildup of captured particulate matter. This cleaning occurs when the DPF system enters regeneration mode. Regeneration is initiated by the system/operator when the exhaust backpressure reaches an engine limit due to captured particulate matter.

Active vs. Passive Regeneration in DPFs — Understanding the Difference

There are two types of diesel particulate filters on the market today: active and passive. Passive diesel particulate filters trap soot and rely on the heat of combustion to regenerate and burn off soot caught in the filter. In cases of intermittent demand, the most likely scenario being standby generators used in data centers or mission-critical infrastructure, the exhaust may decrease by the time it gets to the filter, preventing the DPF from performing the job efficiently. The case of poor performance during a power outage as a result of clogged passive DPFs is a common problem.

Active diesel particulate filters actively regenerate, or "self-clean," during normal engine operation, which ensures maximum flexibility in how facility operators choose to run their generators. Operating independently of exhaust temperatures means a mission-critical facility does not have to install costly generator load banks or run the generator sets for extended time periods to enable filter cleaning. They also reduce diesel fuel consumption on units where filtration is needed.

Benefits of Utilizing CARB-Verified Active DPFs in Power Generation Standby Systems



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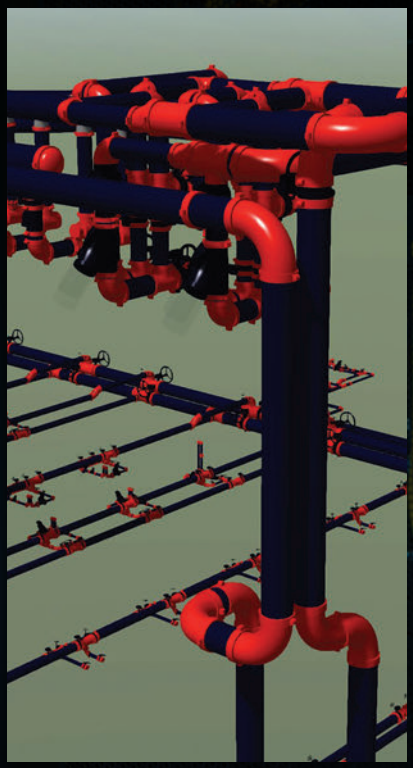

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Using active DPFs that have been CARB-verified ensures the filter will maximize the immediate effect on the surrounding environment as well as the potential benefits to public and community health.

These benefits include:

- critical-grade sound attenuation, eliminating the need for a separate silencer for standby applications;
- the immediate reduction of diesel particulate matter emissions by up to 95%;
- CARB-level 3+ and EPA air quality regulatory compliance;
- positive impact on equipment efficiency and lifespan plus reduced maintenance requirements;
- and reduced fuel consumption, bypassing the need for passive regeneration.

Retrofitting vs. Replacement of Generator Engines for PM Compliance

Retrofitting a diesel standby generator engine involves the installation of updated emissions control equipment, such as diesel particulate filters, selective catalytic reduction (SCR), or exhaust gas recirculation (EGR) systems on an existing engine. Retrofitting:

- Can be a cost-effective option for compliance, as it may require less upfront investment than a full engine replacement
- May not be feasible for older or outdated engines that cannot support the necessary emission control technologies

This west coast data center in Santa Clara, California, installed 25 active diesel particulate filters to the existing MTU S4000 engines to comply with regulatory standards, significantly reducing emissions and maintenance workloads.

On the other hand, replacing the diesel engine outfitted with compliant engine with current emission control equipment ensures that the generator meets current emission standards and provides reliable power while minimizing environmental impacts. Replacement may be more costly than retrofitting and can require more downtime for installation and commissioning.

Meeting Sustainability or ESG Goals Through Exhaust Aftertreatment

Manufacturers of aftertreatment solutions will model the emissions reductions for facilities based on the emission data sheets of their respective generators either installed or in design. This data, when provided to the consulting engineer or facility design team as well as their respective ESG or EHS group, often helps with decision making. Understanding percentage reductions in PM, black carbon and NOx particularly around facilities near communities is particularly impactful.

Facility managers are often concerned that staff may struggle with operation of these systems without prior experience. Training and education by all manufacturers is essential and should include online support, access to resources and regular webinars for specific facilities.

Change is Imperative

Reduction of diesel particulate matter emissions is a critical parallel path to decarbonization and can help prevent a multitude of climate tipping points that could accelerate global temperature rise and its negative impact on society.

"It's become imperative mission-critical facilities utilize the technology we have that will make an immediate and beneficial impact," says Rypos CEO Paul Anderson. "What many don't realize is DPFs will save them labor and maintenance costs in long run."

Bryan Dusza is Project Manager of Rypos. He can be reached at bdusza@rypos.com.

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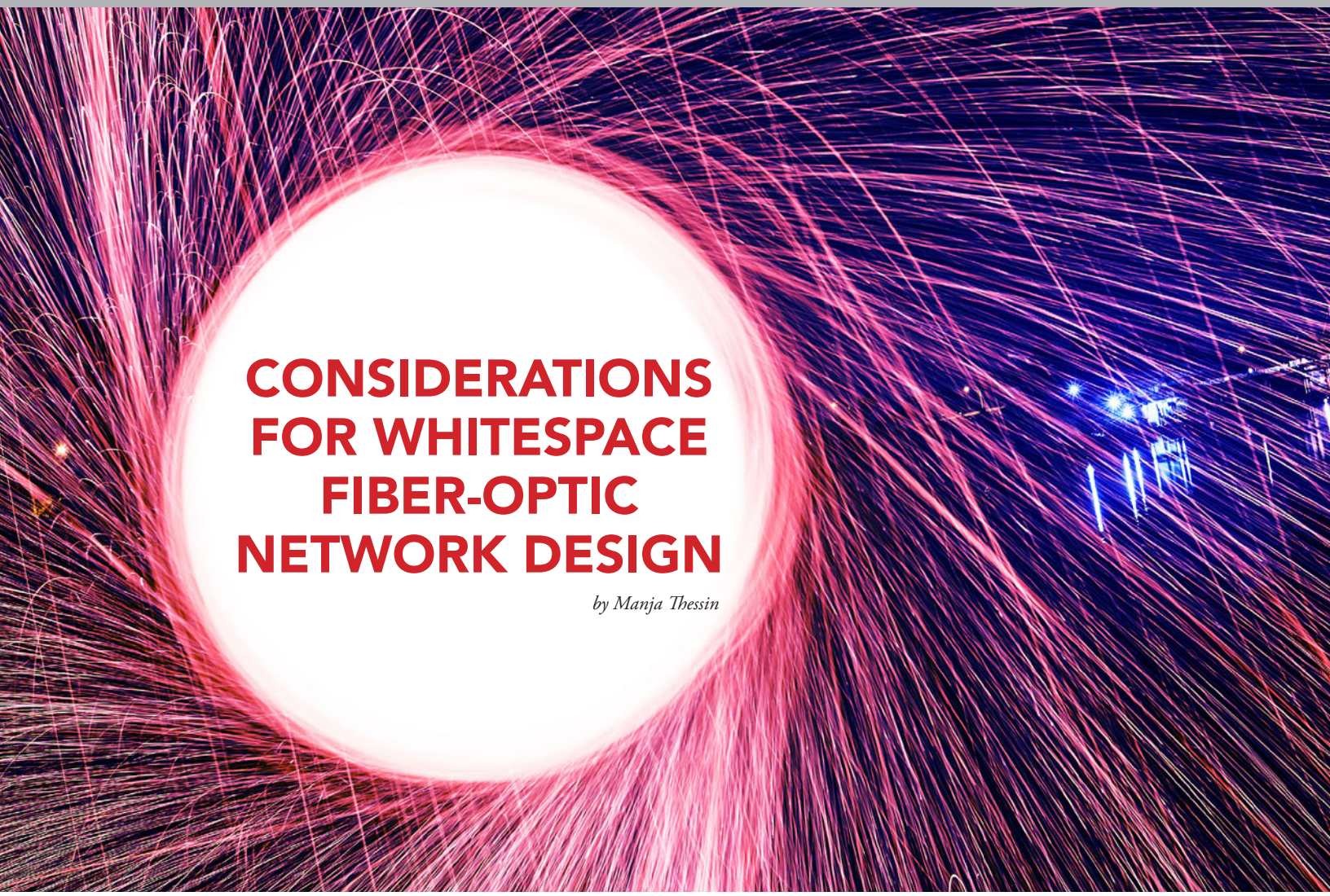

CONSIDERATIONS FOR WHITESPACE FIBER-OPTIC NETWORK DESIGN

by Manja Thessin

The exponential growth and adoption of cloud computing is having a significant effect on the whitespace network infrastructure needs of hyperscale and colocation data centers. According to Gartner, global cloud spending will surpass $1 trillion by 2026 and outperform all other areas of IT spending.[1] This puts tremendous pressure on data center providers to fulfill their promises to the market in terms of cost-effectiveness and reliability while still managing these demands and requirements with sustainability in mind.

As more companies migrate to cloud computing for the benefits of speed, reduced downtime, easier management, and emphasis on scalability, increased demands are placed on the underlying fiber-optic network infrastructure. This infrastructure is becoming increasingly difficult to manage using conventional methods, and data center operators are looking for new and creative solutions to manage this complexity while ensuring their networks' reliability and scalability.

To meet these demands, today's whitespace fiber-optic infrastructure solutions must supply greater bandwidth capacity in smaller footprints and ever-increasing levels of modularity. To achieve this, present and future fiber-optic network infrastructure solutions must be designed around the following four key characteristics: sustainability, accessibility, flexibility, and accessibility.

SUSTAINABILITY. With a growing emphasis on the reduction of our carbon footprint and energy usage, data center operators must adopt a comprehensive approach to sustainability that extends beyond just power and cooling. The passive network infrastructure components and their supply chain are two other key factors to consider.

One aspect focuses on the holistic view of the product life cycle, ensuring that products can be recycled or disposed of safely and responsibly - an alternative to ending up in landfills or polluting the environment. Deploying high-density modern flexible ribbon fiber-optic cables, for example, is one way to help reduce the carbon footprint. When compared to conventional ribbon cables, their much-reduced diameter construction requires far less space in conduits and cable trays, significantly reducing the number of carbon-emitting materials in the build. Additionally, this makes for smaller cable reel

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sizes and weight enabling more environmentally friendly handling and transportation.

Product optimization is another important aspect of introducing sustainable practices into data center network builds. This entails manufacturing products that can be easily repaired rather than replaced, thus designing network infrastructure to have a longer lifespan. High-density modular platforms with swappable fiber cassettes, for instance, can support multiple technology lifecycles, minimizing the need for frequent hardware replacement.

Going green is beneficial for both the environment and business. Data center operators can reduce their environmental impact and ultimately save money by introducing solutions designed with environmentally friendly products and in concert with a sustainable supply chain.

ACCESSIBILITY. After installation, access to and management of the fiber-optic network infrastructure are crucial. In this context, accessibility refers to technicians' ability to access and make essential network changes without risking disruption.

Deploying an effective cable management system is one of the most important components of accessible whitespace fiber-optic cabling infrastructure. These systems enable easy identification and access to cables, cable organization and routing, reducing clutter and improving airflow in racks and cabinets. This not only improves the data center's overall performance but also makes it easier to diagnose and repair problems, significantly reducing costly downtime and maintenance. Also important are modular and scalable connectivity solutions, such as patch panels, which can be easily added or removed to accommodate infrastructure changes. These are important considerations for future upgradability.

FLEXIBILITY. As data centers continuously evolve and adjust to the ever-changing technological landscape one thing remains constant: the need for flexibility. Here, a flexible fiber-optic network infrastructure ensures that data center operators have a high-performance and adaptable foundation to support a high degree of mobility. Modular fiber housings that accept a variety of cassette options supporting diverse applications, technology iterations, or cabling form factors, ensure that compatibility issues are minimized when dealing with architecture changes. For example, selecting a patch housing that allows the simple interchanging of cassettes and adapter modules allows organizations to scale up or down with network speed demands, without added hardware investments. Furthermore, using highly modular components such as those compatible with modern flexible ribbon fiber solutions provides substantial flexibility in the number of fibers connected, allowing data center operators to build a network today with confidence that they can adjust it as demands change in the future.

EXPANDABILITY. A network's capacity to handle increased traffic and more connection points in the future is referred to as expandability. The simplest solution to that today is to deploy more fiber. There are several factors to consider when it comes to expandability, the most important of which are modularity and space optimization. Solutions that deliver reduced physical dimensions, requiring less space in cabinets and racks, ensure that available space is reserved for future expansion, thus improving costly whitespace real estate usage. In practice, this can be realized by deploying small form factor connectors, such as single cable termination using array-style connectors, which enable higher density within the same footprint when compared to traditional duplex connectors. Reduced diameter fiber-optic optic patch cabling is aided by deploying 16-fiber MTP/MPO cables that use the same external connector footprint as traditional 12-fiber ferrules. This enables aggregation of multiple 8-fiber parallel transceivers and coupling directly to emerging 16-fiber parallel fiber links such as 400G QSFP- DD and OSFP, vastly reducing cabling overheads. These are just a few measures that data center operators can deploy to fit more fiber in the same space, at a minimal incremental cost, ensuring their network with future expandability.

Success in implementing high-density, high-fiber count cabling solutions effectively requires new and innovative solutions that solve the problems of managing and connecting ever-increasing fiber counts. Data center operators can no longer afford to disregard the dynamic nature of their physical access network requirements if they want to ensure their data centers' capability and readiness to meet the growing demands on performance. The pace of change and the potential to capitalize on future opportunities relies on a whitespace fiber-optic network that is designed with sustainability, accessibility, flexibility, and expandability in mind.

References

[1] Gartner predicts robust cloud computing market till 2027. (2022, December 9). Retrieved from TechRepublic: https://www.techrepublic.com/article/gartner-predicts-robust-cloud-market/

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DEVELOPING DATA CENTERS: FINDING SUCCESS WITH CHALLENGING SITES

Demand for data centers is growing by leaps and bounds. Construction in the U.S. is expected to reach $25 billion by 2027, with approximately 2,825 megawatts of power capacity added over the next five years. **(source)**

by Keith Simpson

But for those seeking to capitalize on the boom, this growth has a downside.

Desirable sites are scarce, forcing developers to look beyond the obvious for suitable locations and deal with delays caused by a range of issues that go hand-in-hand with imperfect sites.

Given the situation, streamlining development requires in-depth knowledge of data center challenges, and developers need insights for addressing them creatively.

Based on my experience, here's a topline of what you need to know to effectively navigate the new realities of the data center market.

GETTING AHEAD OF DATA CENTER CHALLENGES

With no easy sites remaining, every prospective site requires even more careful vetting. This means that being proactive and strategic about site selection and land planning is non-negotiable – it's the single most critical factor to preventing a host of challenges down the road.

For example, the utility-intensive nature of data centers requires sites to support power, communication, and water needs – all of which must be considered from the start.

Additionally, it's vital that developers account for anything out of the ordinary. Consider floodplains, resource protection areas, endangered species habitats, and environmentally sensitive locations. If you neglect to examine these early in the process, the usable area might end up being much smaller than you anticipated. Bohler industrial market Associate Megan Baird, PE, shares this insight with Bohler's data center developer clients:

"Spending more time upfront in the strategy and planning phase can delay your start, but that delay can help get relevant agencies on board and receive permits faster."

Streamlining processes that involve the Army Corps of Engineers and environmental permitting agencies saves time later in the project – particularly with strategic construction phasing. It's also important to get entitlements and zoning in place before developing a site plan for construction approval. This due diligence

and strategic planning help avoid expanding timelines.

Everything related to data center development – from buildings and equipment to grading and stormwater – can be implemented more efficiently with proactive planning and aggressive due diligence.

The bottom line is time is money. When the construction timeline can be reduced, there's an opportunity to save costs.

BRINGING COMMUNITIES ON BOARD

Data centers are good neighbors. They generate very little traffic and, unlike other property types, don't strain community resources such as law enforcement, fire departments, and schools.

However, misconceptions about data centers do exist, and concerns are increasing as facilities move closer to residential areas. Topping the list are size, appearance, traffic, and noise.

Therefore, it's critical to address key stakeholders and the community upfront.

Help shift perspectives and bring communities on board by explaining how noise will be mitigated through natural or manufactured buffers that keep sound on site and demonstrating ways of making facilities more visually appealing.

Presenting innovative approaches that avoid the "gray box" model also builds trust in the team behind the project and consensus moving forward.

Discuss how artificial windows, elevation changes, and pleasing color combinations will give the data center character and help it fit harmoniously within the surrounding community.

Edge data centers also present an attractive option. These smaller facilities require less power and land and avoid frustrating latency issues for users.

Increasingly needed in suburban settings, edge data centers provide opportunities for developers to reassure communities, get them behind the project and, as a result, reduce the risk of objections or delays during public hearings.

PLANNING FOR POWER

Power is a limiting factor for data centers. Building size and increased computing power needs often require additional on-site substations to supply the larger amount of energy needed to run a data center.

Challenges related to placing, designing, and building substations include but are not limited to:

- Material logistics
- Proximity of transmission lines
- Availability of utilities
- Electrical support infrastructure
- Optimizing site layout and grading
- Additional time for permitting

Like so much related to data center project success, ensuring power availability requires the knowledge and experience to pre-plan properly.

THE DATA CENTER DIFFERENCE

The nature of data centers – especially their large draw on utilities – means proactivity is even more paramount than for other types of industrial projects.

Working with a team that's a local expert and current on regulations not only saves time and avoids confusion but also enables developers to pivot quickly and implement different timelines. In fact, Bohler often advises proceeding with certain steps concurrently to shorten the timeline or make up for the lost time.

Making complex decisions, such as how to time purchases to align with approvals in light of supply chain challenges, also benefits from the guidance of the right team.

Keith Simpson is Director of Engineering of Bohler. He can be reached at ksimpson@bohlereng.com.

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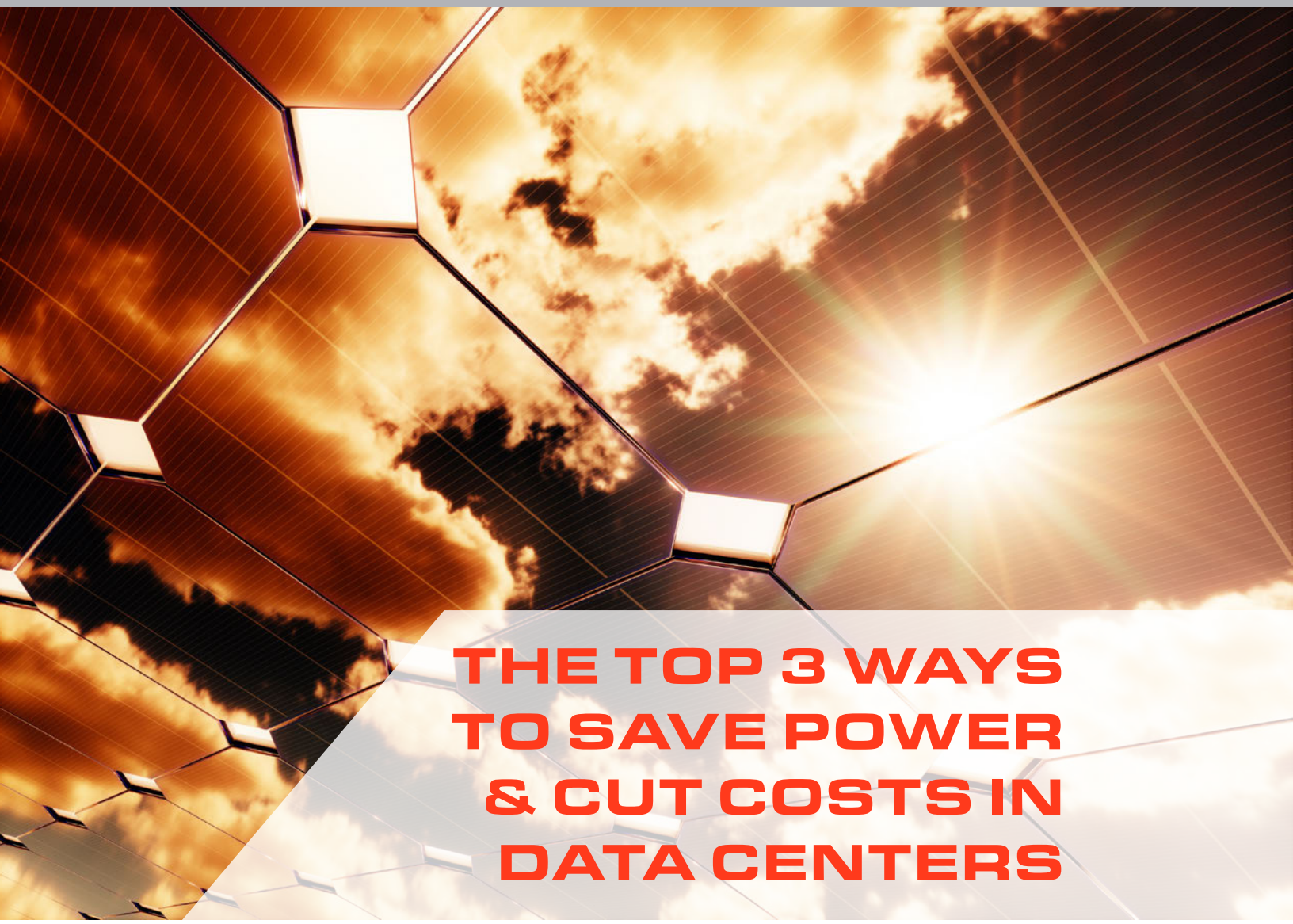

THE TOP 3 WAYS TO SAVE POWER & CUT COSTS IN DATA CENTERS

by Mike Jones

With the US data center demand forecasting to grow by 10% a year until 2030, it is more important than ever to reduce costs, risks and energy consumption in your data center. With the global economy changing the landscape of the digital infrastructure industry, the cost of capital and energy are impacting operating expenses (growth and current operations). Moreover, as the building boom continues, the short and long-term consequences have begun unfolding.

On the operating budget, the cost of energy is the most significant impact on existing operations.

For example, the Uptime Institute IT Spending Survey recently stated, "Enterprise and colocation operators have seen the greatest unit cost increases in power over the past year." And according to Mckinsey, "the operating margins of colocation companies are under pressure from prominent cloud vendors. As a result, they are signing shorter-term contracts." This is pressuring everyone, including investors' expected yields, colocation margins, hyperscaler budgets and, in general, increased costs are outpacing increased budgets year over year.

To start, the three most significant efficiencies for improving operations strategies can be gained at the site level. The shared key foundational element to all of them is effective training as part of a comprehensive workforce development program. Before you can implement any of these initiatives, you have to have the training in place to be able to execute. The three key initiatives are:

- Building Cross-Functional Teams
- Further Efficiencies with Technology
- Leveraging the Power of Self-Perform Manufacturer Maintenance.

Building Cross-Functional Teams

Whether you outsource site-level services or do them in-house, chances are your facility is organized in a manner comprised of traditional practices that build three distinct teams of information technology, critical environments and security. With the advances in technology and re-skilling of site level resources, the optimal solution is to consolidate these teams into one multi-skilled team of operators rather than the legacy organization that siloes multiple functions from corporate organizations down to the site-level. The consolidation reduces costs and builds a highly efficient team environment mitigating risk that will drive more significant results from retention to performance. Retention leads to cost savings for human resources and training groups with fewer positions to backfill and train.

The Multi-skilled operational model also promotes career development and advancement as well as the improvement of job satisfaction, with organizations seeing, on average, a 47% increase in employment duration for employees who perform multi-skilled functions. The importance to employees is monumental – a recent McKinsey article stated that the top reason for people leaving jobs between April 2021 and April 2022 was a lack of career development and advancement. But to implement this initiative effectively (resulting in 35%+ savings in staff costs), it is vital to have an established training program. This will also require redefined job families and an approach to career planning and HR management that will resolve any talent shortage you may be experiencing.

Further Efficiencies with Technology

Invest in the systems that will allow you to implement an effective condition-based maintenance program and monitoring with predictive analysis. Condition-based maintenance aims to perform when it's needed – and not before. Technicians only perform service when evidence (the indicators) supports it. This leads to reduced risk (since the equipment is touched less often), cost savings in spare parts, lower labor costs, and reduced unplanned downtime compared to preventive maintenance, which is calendar-based and performed on a consistent schedule. Another critical function of the technology is effective monitoring and predictive analysis that becomes routine and reduces incidents.

Embracing technology requires constant change, and taking the first step will help you institutionalize the momentum of continual improvement. Most data is already being collected, whether it's hours of use, remaining useful life, oil, pressure and vibration analysis, and temperature. The key is training staff to collect or verify that technology captures the data and build analysis models that review trends and early thresholds that indicate when maintenance should be scheduled and performed. Once implemented, you should expect savings in maintenance of 20%, parts and consumables costs of 40% as a result and long-life expectancy on equipment. Finally, advances in AI, robots, drones and many others are being tested and should be embraced as they will lead to further efficiencies.

Leveraging the Power of Self-Perform Manufacturer Maintenance

By partnering with manufacturers, your on-site teams can take over routine maintenance, such as the monthly and quarterly reviews, without risking warranties. Most of these activities involve inspecting, verifying, reviewing, and recording the integrity, condition and cleanliness of assemblies, equipment and systems (far less complex than Original Equipment Manufacturer (OEM) maintenance which involves calibrating, changing and updating these components).

Implementing self-performing manufacturer maintenance in data centers can be a cost-effective way to maintain critical equipment and reduce downtime. However, it is important to ensure that staff is properly trained, that spare parts are readily available, and that safety protocols are followed to minimize risks and maximize the benefits of this strategy.

Overall, these steps are driving innovation and improving the efficiency, resilience, and sustainability of data center operations. As technology continues to advance and business needs evolve, data center operations strategies will continue to evolve to meet these challenges.

Mike Jones is EVP Global Operations at Salute Mission Critical. He can be reached at marketing@saluteinc.com.

RETHINKING DATA CENTER CONTAINMENT ENCLOSURES AND CEILINGS TO MAXIMIZE EFFICIENCY

by Bill Frantz

INTRODUCTION

Most legacy computer rooms and data centers are equipped with raised floors to accommodate data and power cables and to distribute cold air supply to the IT equipment. As data centers become larger, on-slab designs that use Hot Aisle Containment (HAC) become a more popular choice. The reasons are numerous and include: reduced ducting, flexible airflow management,

IT equipment weight supported directly on slab, cost avoidance of raised flooring, reduced maintenance cost, more robust seismic performance on slab versus raised floor. Good containment systems, which include aisle containment enclosures and overhead ceilings become critical. (Figure 1)

ENCLOSURES AND CEILINGS AFFECT CONTAINMENT

In a typical air-cooled data center, airflow management is about delivering cool air to the IT equipment and returning warm air to the computer room air hander (CRAH). Cooling is most efficient when hot and cold airstreams are separated to prevent mixing thereby improving predictability and control. The containment of hot and cold air is one of the most promising energy-efficiency measures available to both new and legacy data centers.

Hot Aisle Containment (HAC) is a popular strategy where cold air is supplied to the room and passed through the IT equipment before returning to the CRAH. Ideally, the air supplied by the CRAH is in balance with the air demanded by the IT equipment so that conditioned air passes once through the racks. In the real world, some amount of air bypasses the IT equipment or recirculates through it due to leakage in containment structures. The result is elevated fan power and reduced chiller efficiency.

Figure 1. Hot Aisle Containment (HAC) enclosures with gasketed, low leakage rate structural ceiling system. Ceiling panels form a low-leakage return air plenum for the hot aisle. Suspension grid supports infrastructure and eliminates leak-causing rod penetrations through the ceiling.

Containment options are numerous. Recently introduced choices include well designed enclosures, combined with low-leakage gasketed ceilings and structural suspension systems.

The suspension system is also the infrastructure carrier for busway, cable tray, and fiber. By coordinating the choice of enclosure, ceiling, and suspension, significant leakage paths can be reduced and controlled. (Figure 2)

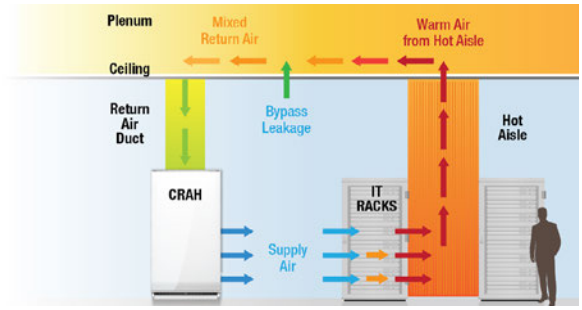

Figure 2. Cool supply air passes through the IT racks, picking up heat, and enters the hot aisle to leave through the ceiling plenum. Some cool air can also bypass the server and leak through the ceiling into the plenum. Careful selection and matching of enclosures and ceiling systems can greatly reduce wasteful by-pass leakage.

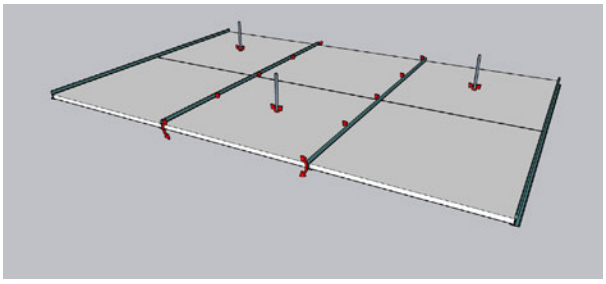

Figure 3. Typical non-gasketed ceiling tile with tee-bar grid and drop rod penetrations. Leakage rate may be 1.44 [cfm/ft2] at 0.02 [in WC]. Uncontrolled leak points contribute to by-pass leakage.

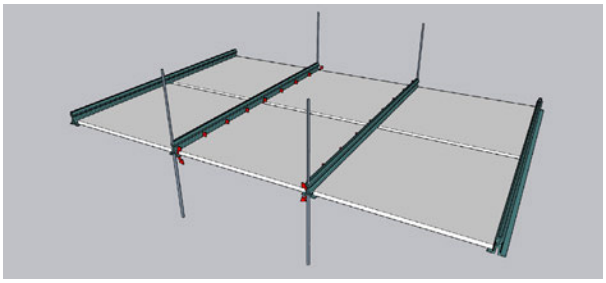

Figure 4. Newly developed gasketed tile systems with structural suspension grid reduces leakage at the tile perimeter and eliminates leakage around drop rods. Leakage rate may be 0.19 [cfm/ft2] at 0.02 [in WC]. The ceiling system, and resulting return air plenum space, becomes a low-leakage part of the overall containment system.

CEILING PLENUMS ARE PART OF CONTAINMENT SYSTEM

Designers must pay attention to components that are known sources of fugitive and distributed leaks to reduce bypass losses. In the case of HAC systems, ceilings form a return air plenum and, more importantly, separate the warm return air from the cool conditioned room. They become an important part of the overall air containment strategy. Gaps around the tiles and drop rod penetrations allow conditioned air to bypass the IT equipment. The bypassed air must be made up by increasing cold air supply from the cooling units, thereby consuming more energy. (Figure 3 and Figure 4)

Typical ceiling systems have leakage rates far larger than raised floor systems. At a differential pressure of 0.02 [in WC], a raised floor system may leak about 0.05 to 0.30 [cfm/ft2]. A non-gasketed ceiling with typical drop rod penetrations will leak about 1.44 [cfm/ft2]. When factory-gasketed ceiling tile is combined with aluminum structural grid, leakage is reduced to about 0.19 [cfm/ft2] and becomes comparable to raised floor and containment wall systems. (Figure 5)

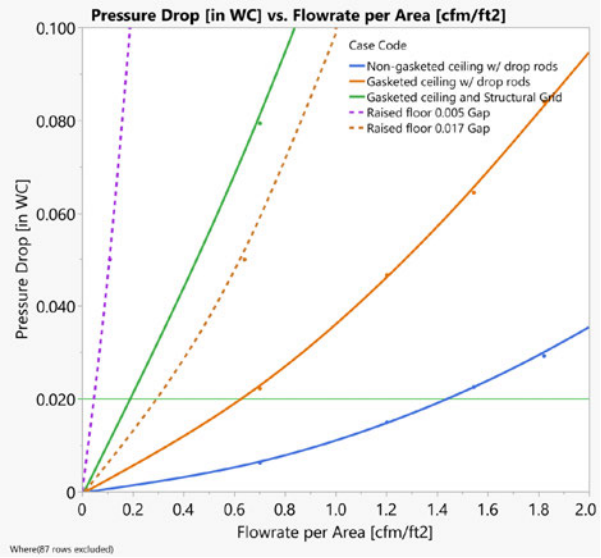

Figure 5. Leakage resistance curves for a wide range of ceiling and suspension systems. Recently developed ceiling systems can reduce leakage rates to the level of raised-floor systems.

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The use of factory-gasketed ceiling tiles in conjunction with aluminum structural grid is an engineered solution designed for data centers. The tiles feature a perimeter gasket that reduces ceiling leakage at the tile edges. The structural grid supports the tiles and also eliminates drop rod ceiling penetrations. Paired together, the system reduces bypass leakage down to levels matching the rest of the containment system. This type of ceiling solution delivers accessibility and containment that improves both cooling efficiency and saves fan energy.

To illustrate this, heat balance and airflow calculations were solved to satisfy the governing equations for 4,000 random combinations of design and operating parameters. The resulting chart clearly shows the effect of changing from a typical (high leakage) ceiling to the (low leakage) gasketed ceiling with structural grid system. (Figure 6)

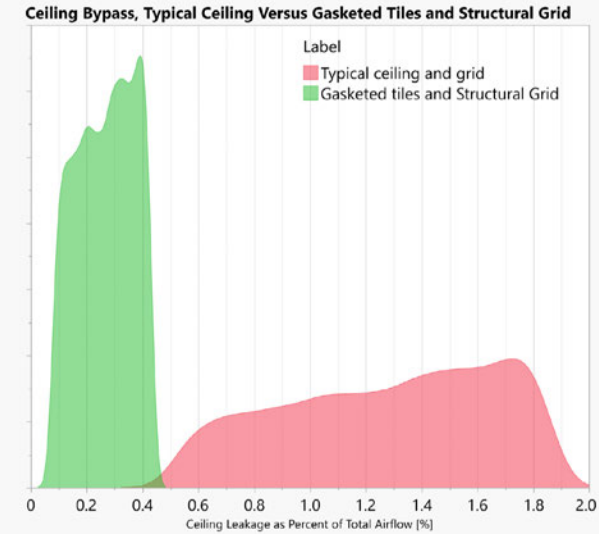

Figure 6. Typical high leakage suspended ceilings may have bypass leakage rates of 0.4 to 2.0 [%] for total HVAC system flow (right distribution). Newly developed low leakage ceiling systems reduce that bypass leakage to below 0.5 [%] of total HVAC system flow (left distribution).

In these simulations, typical "leaky" ceiling systems may have bypass leakage values ranging from 0.6 to 2.0 [%]. Improved ceiling and grid systems reduce this leakage to below 0.6 [%]. Reduced leakage across this containment plane reduces bypass losses, thereby reducing fan energy and operating costs.

MAXIMIZE ENERGY EFFICIENCY AND SUSTAINABILITY

Ideally, total cooling capacity (supply airflow) would exactly match the IT load (demand airflow) and cooling unit set points would be raised as high as practical. However, there are fugitive leaks within the IT racks. The goal is to minimize this leakage as much as possible through good containment enclosures and ceilings. When this is achieved, there will be consistent supply temperatures across the server inlets on all racks throughout the data center. This level of airflow management may allow cooling set points to be increased resulting in additional energy savings, higher equipment reliability and lower Mean Time Between Failures.

CONCLUSIONS

Energy efficiency will continue to be a top concern for data centers in the future. Data center designers and owners must carefully evaluate all options. When thinking about containment, ceilings, suspension, and enclosures all must work together. Ceiling and grid systems form return air plenums in data centers and separate cold supply air from warm return air. Leaks across this containment plane contribute to bypass losses, increased fan energy, and increased operating cost. The use of gasketed ceiling tiles with structural grid reduces leakage rates to very low levels. This will make new and future data centers greener and more environmentally conscious.

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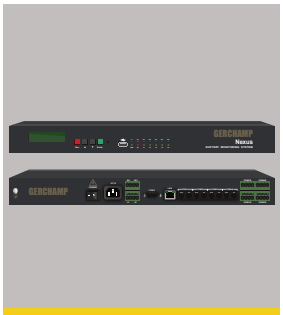

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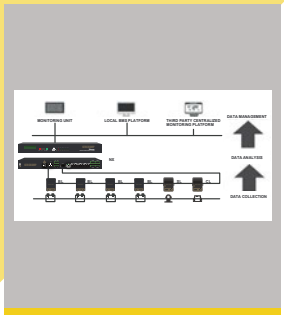
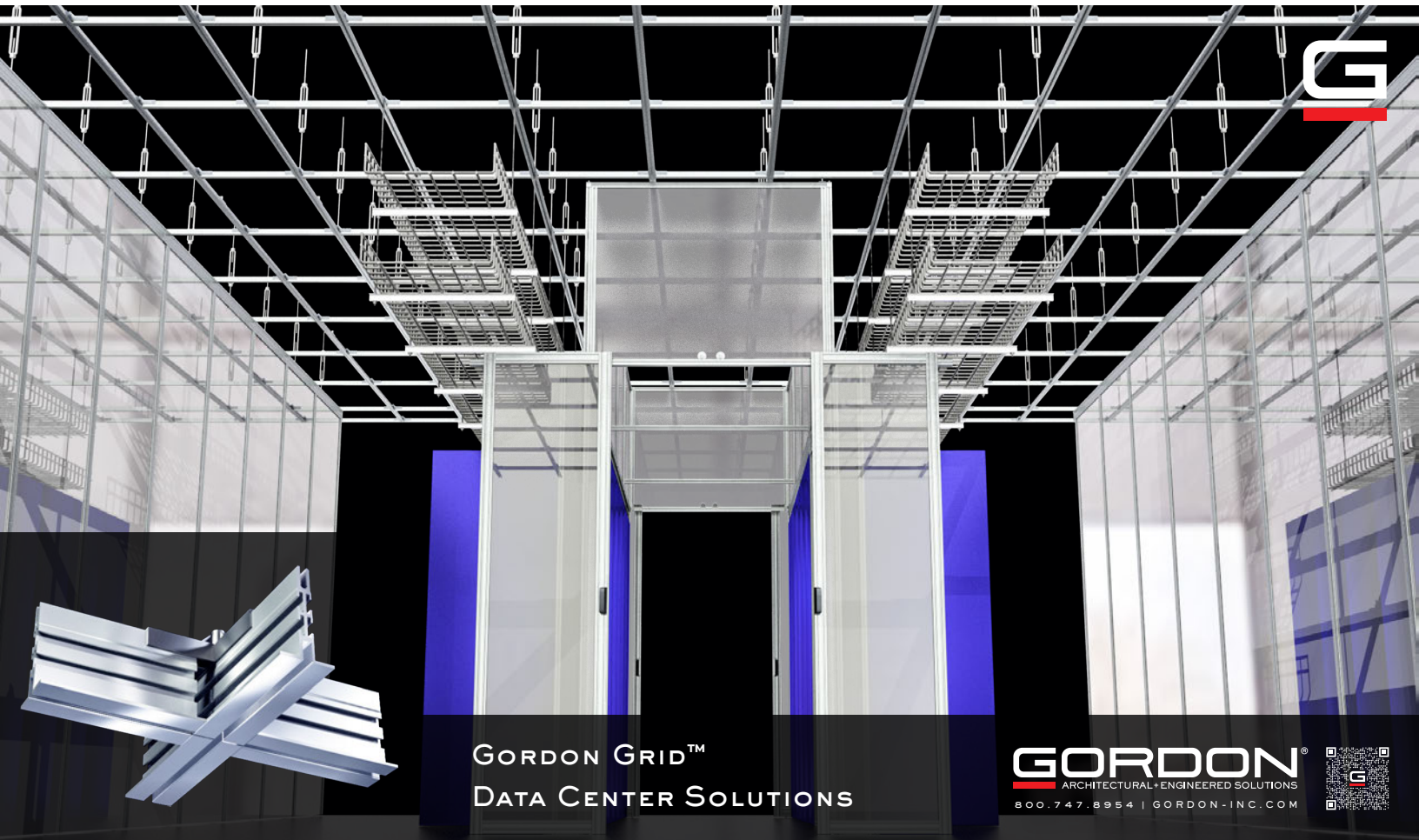


Topology

Topology Image

The Gerchamp battery monitoring system (BMS) is a high-end product specially designed for the mission critical backup power systems. The BMS can provide early warning of a thermal runaway event of battery systems and battery equalization. Products meet the requirements of the ANSI/TIA-942 standard.



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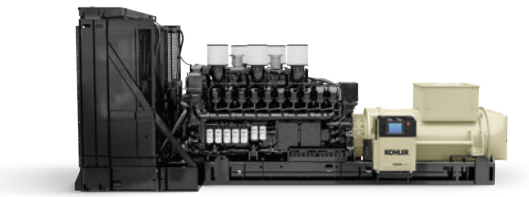

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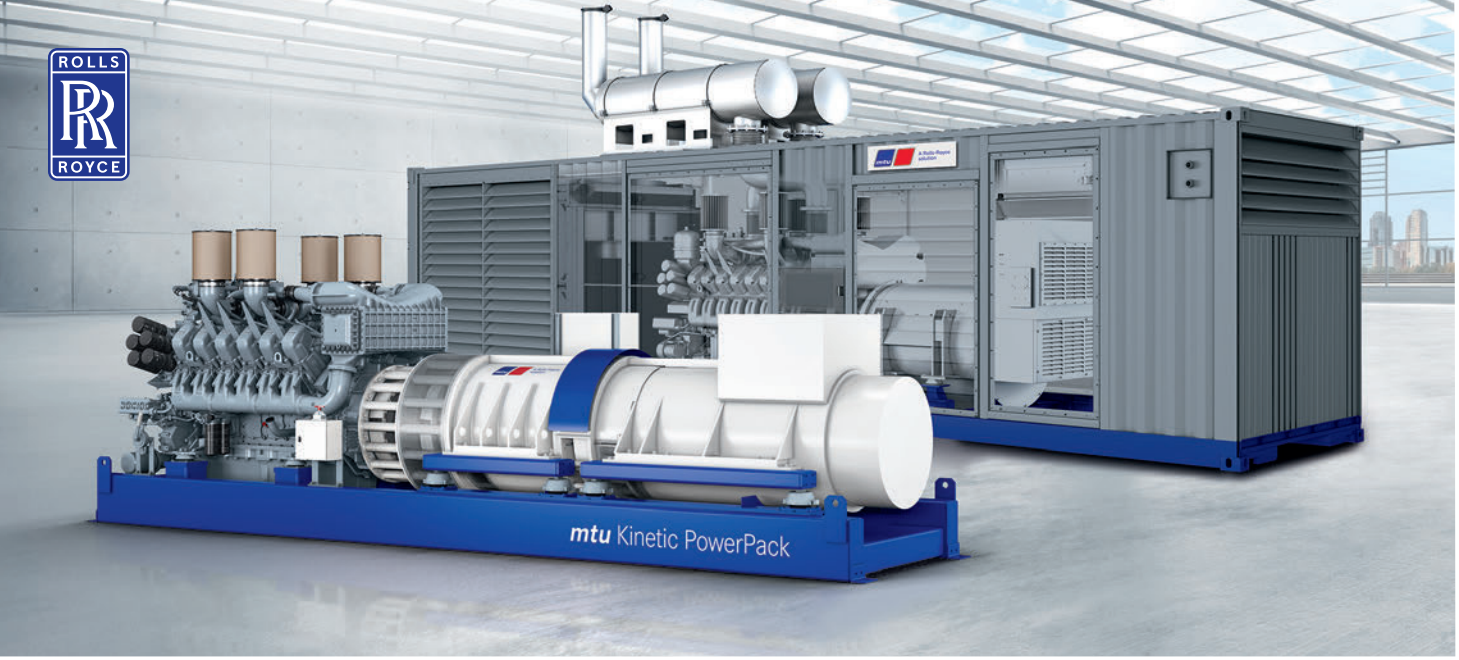

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MISSION CRITICAL FACILITIES

October 8-11, 2023
Gaylord Texan Resort, Grapevine TX

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DEADLINE: **JUNE 23, 2023**

SUBMIT AN ARTICLE FOR THE 2023 FALL ISSUE OF 7X24 EXCHANGE MAGAZINE

Visit www.7x24exchange.org
and download the Call for Articles

DEADLINE: **JULY 7, 2023**

2023 SPRING CONFERENCE

June 4-7, 2023
JW Marriott Orlando Grande Lakes, FL

PANDEMIC LESSONS LEARNED

END-TO-END RELIABILITY:
MISSION CRITICAL FACILITIES

2023 SPRING CONFERENCE HIGHLIGHTS

The Spring Conference themed "End-to-End Reliability – Pandemic Lessons Learned" will be held June 4-7, at the JW Marriott Orlando Grande Lakes in Orlando, FL. The Conference will feature compelling keynotes, high level speakers, concurrent sessions, a Women in Mission Critical Operations session and networking event, an Evening Universal Orlando Resort and more…

Florent Groberg, Head of Microsoft Azure's Global Government Mission; Former Captain, U.S. Army and Congressional Medal of Honor Recipient, will kick off the conference with a keynote address on the topic **"Opportunities Earned & Leadership Learned: An American Hero's Journey"**

A true American hero as humble as he is grateful, Medal of Honor recipient Florent Groberg will share an unforgettable story and equally remarkable lessons on leadership, selflessness, and the importance of setting goals and earning what you wish to achieve. With a palpable passion for sharing his journey to inform and inspire others, Groberg discusses the key stages and people in his life, and how they shaped him to be the leader, advocate and role model he is today, including: growing up abroad and lessons from his mother and adoptive father; his immediate, innate desire to take action as he watched the 9/11 terrorist attacks unfold from his college dorm room; his patient and persistent efforts to enlist in the U.S. Army; and his selfless actions in Afghanistan that earned him the nation's top award for valor in combat.

Our second conference day will open with a Keynote "The Unappreciated Variable" by Chris Crosby, Chief Executive Officer at Compass Datacenters.

The closing keynote "Sustainable Future for Data Center Power" will be delivered by Peter Panfil, Vice President Global Power at Vertiv.

Additional presentations will be delivered on compelling mission critical industry topics:

- Future Proof the Supply Chain
- Pandemic Lessons Learned During the Commissioning Phases
- WiMCO: The 21st Century Gold Rush – Will the Education Gap Result in Fools Data?
- We are at an Inflection Point-Direct Liquid Cooling
- Applying Machine Learning to Optimize Data Center Cooling
- Real World Transition to On-Condition
- Public Cloud vs. On-Prem: Comparing Data Center Strategy and Cost on the Road to 400 Gig
- The Ties that Bind: Service Continuity in the Midst of Chaos

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JUNE 06, 2023 • 6:30PM TO 10:30PM

Join us for an Evening at Universal Orlando Resort
Transportation will be provided from the JW Marriott Orlando Grande Lakes

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2022 FALL CONFERENCE HIGHLIGHTS

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- Lake Michigan Region
- Lone Star (Dallas)
- Metro New York
- Midwest
- New England Area
- Northern California
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- Ohio
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VISIT **WWW.7x24EXCHANGE.ORG/CHAPTERS/** TODAY TO PARTICIPATE IN YOUR LOCAL CHAPTER

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7x24 EXCHANGE

Women in Mission Critical Operations® (WiMCO®)

As the leading knowledge exchange in the mission critical space, 7x24 Exchange recognizes the importance of increasing the engagement and participation of women in the industry. This understanding has led to the development of 7x24 Exchange WiMCO (Women in Mission Critical Operations) which will focus on:

- **Recruiting women into the 7x24 Exchange organization**
- **Supporting WiMCO initiatives at the Chapter level**
- **Promoting mission critical opportunities for women**
- **Providing leadership opportunities through the community**

2022 Spring Conference WiMCO Session Speakers
Left to right: Donnie Smith, Chief Commercial Officer, Miller Electric Company; Marissa Daniel, Project Manager, Miller Electric Company; Juli Ierulli, Global eCommerce Growth Manager-Electric Power Division, Caterpillar, Inc., and Vice President / NationalWiMCO Committee Chair, 7×24 Exchange International.

Take a look at what's happening with WiMCO

Email ***wimco@7x24exchange.org*** for more information.

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INTERNATIONAL DATA CENTER DAY
Powered by 7x24 Exchange International

2023 INTERNATIONAL DATA CENTER DAY RECAP

March 22, 2023, marked the celebration of the 5th International Data Center Day. Launched in the fall of 2019, International Data Center Day is designed to create awareness of the data center industry and to inspire the next generation of talent. It provides the industry with an opportunity to open its doors and show, in a collaborative effort, what data centers are, why they are so important to our connected world, and the wide array of career opportunities that are part of the data center industry.

Although this year's celebration was held March 22, the organization encourages those in the mission critical industry to engage in raising awareness of the industry year-round. To that end, the new motto is "Every Day is International Data Center Day."

THIS YEAR'S THEME IS DATA CENTER CONNECT

This year's main activity is called Data Center Connect, which encourages professionals to connect with schools in their local area. If each data center professional connects with a local school, think of how many students will consider a career in the critical field.

Listen to The Thought Cloud Here

THE THOUGHT CLOUD PODCAST

THE KICKOFF

This year's International Data Center Day season kicked off with The Thought Cloud Podcast interview of Bob Cassiliano, chairman & CEO of 7x24 Exchange, and Brian Schafer, president of the Metro New York Chapter of 7x24 Exchange.

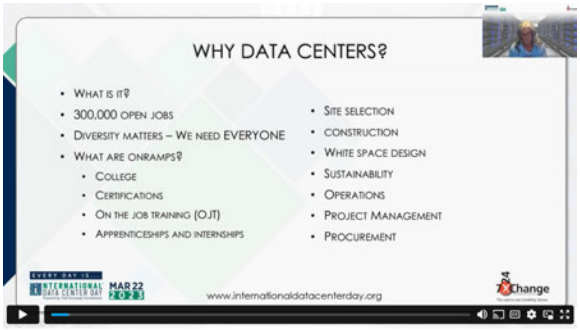
Together they educated listeners on the origin of the initiative, the various ways to participate in raising awareness of the data center industry, and how to inspire the next generation of talent.

Bob Cassiliano

Brian Schafer

ONLINE PRESENTATION

Next up was a webinar hosted by 7x24 Exchange entitled "Bridging the Data Talent Divide with On-ramps" presented by Carrie Goetz, Principal/ CEO, StrategITcom and author of Jumpstart your Career in Data Centers. The 30-minute presentation introduced the many facets of data center careers to college students.



7X24 EXCHANGE CHAPTERS PARTICIPATED BY HOSTING ACTIVITIES WITH SPONSORS IN THEIR LOCAL AREAS.

The **Greater Washington D.C. Chapter** held a 4.99999 Cloud Run in their local area. Despite the inclement weather, many people participated in the event showcasing local-area data centers. Proceeds of this race benefitted Dulles South Soup Kitchen and the 7×24 Exchange DC Chapter Scholarship Fund.

The **Northwest Chapter WiMCO** community hosted 16 students from Bothell High School and Woodinville High School to learn more about careers in the data center industry. They also received a rare opportunity to tour the AT&T Bothell 9 Data Center. The kids were engaged and asked so many great questions. It is our hope that we can repeat this event for years to come.

Netrality Data Centers celebrated International Data Center Day, powered by 7×24 Exchange International, at their 401 N Broad facility in Philadelphia on March 22nd. Students from Liguori Academy, Delsea Regional, and Roman Catholic High School were hosted by the company.

After the presentation, students took a tour of Netrality's facilities and visited their tenant Nerd Street, a national network of esports facilities and events dedicated to powering competitive opportunities for gamers.

Cloud Run participants at the finish line.

Students at the Bothell 9 facility.

Students visited Netrality tenant Nerd Street, a national network of esports facilities

Students learning about data center operations.

ORGANIZATIONS FROM ALL OVER THE GLOBE SHOWED THEIR SUPPORT FOR INTERNATIONAL DATA CENTER DAY.

Data Centers, mission critical teams, and other tech firms gave in-person tours to students, created interactive content and rich social media highlighting their activities. At one point, on March 22, the organization was even mentioned by one commentor as causing a "Tweetstorm," which is considered a sort of badge of honor on the platform.

7X24 EXCHANGE INTERNATIONAL CONTINUES TO BUILD ITS INTERACTIVE CAREER TREE.

Visitors who use the career tree can learn from industry professionals about different career paths within the mission critical industry. With four "branches" containing well over 20 "leaves", users can watch video interviews from sales and marketing, operations, design, and information technology professionals.

We encourage data center professionals to help us grow and nurture the Interactive Career Tree by volunteering for interviews to be featured there.

View the Interactive Career Tree

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INTERNATIONAL DATA CENTER DAY IS THRIVING, AS EVIDENCED BY THE AMOUNT OF SUPPORT SEEN ON SOCIAL MEDIA AND SHARED WITH 7X24 EXCHANGE.

It is terrific to see organizations and individuals not only adopting the initiative but enthusiastically raising the bar of their celebrations year after year.

Want to show your support throughout the year? Be sure to post your events on social media and tag us with #intldatacenterday

To see other examples of the impact of the day's reach, visit https://www.internationaldatacenterday.org/activities/

Stay Informed
Join Us on LinkedIn, Twitter, YouTube... and now, Facebook!

As 7x24 Exchange International prepares for numerous events including the 7x24 Exchange Spring Conference in Orlando, FL, STEM activities, Chapter events, and more, we'd like to invite you to follow us on our social media platforms.

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For information about sponsoring an event or for more detailed information not available at www.7x24exchange.org, please contact us at info@7x24exchange.org or (646) 486-3818.
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